‘if he chooses to speak from these roots’: Entanglement and Uncertainty in Charles Olson’s Quantum Ecopoetics

Abstract

This article offers a material ecocritical reading of the work of Charles Olson, arguing that Olson’s oeuvre constitutes a critical moment in the evolution of contemporary ecological thought. The article begins by highlighting the revival of interest in mid-twentieth-century philosophy of physics texts within ‘new materialism’, before moving into a comprehensive exploration of the degree to which the same mid-century science writing transformed Olson’s literary depictions of the human and the environment. This work exposes the significant parallels between Olson’s literary response to quantum ideas and their deployment in contemporary theory, providing valuable historical context to ecocriticism’s current ‘new materialist’ turn.

Keywords

Ecocriticism, American Literature, Ecopoetry, Charles Olson, New Materialism, Quantum.

The ‘new materialist’ turn in contemporary critical theory has heralded a remarkable renaissance in twentieth-century philosophy of science writing. In particular, the works of Alfred North Whitehead and Niels Bohr have been widely cited in recent theoretical texts. This article offers a measure of historical contextualization to the contemporary ‘new materialist’ turn by suggesting that the ouevre of the mid-twentieth century American experimental poet Charles Olson constitutes a significant and unrecognised precursor to contemporary material ecocritical engagements with the work of Whitehead and Bohr. Olson drew heavily on the work of Whitehead, and he was also influenced by Bohr’s ideas, which he encountered through the writing of Werner Heisenberg. I will suggest that engagement with the quantum-inspired philosophy of science writing of both men caused Olson to rethink the human-world relationship in material and interdependent terms during the years when the philosophical implications of quantum physics were first widely popularised, some sixty years before the rise of new materialism (Smith 1996, 91). Olson’s theoretical work, outlined in essays including ‘Projective Verse’ (1950) and ‘Human Universe’ (1951), directly informed the development of his experimental ecopoetics. An appreciation of the relationship between Olson’s engagements with mid-century philosophy of science work and those present in contemporary new materialism therefore provides some valuable historical context to the current ‘new material’ theoretical turn in ecocriticism, whilst making a new case for the continued relevance of Olson’s work to the field.

Olson’s work has received relatively little attention from ecocritcs – an omission that is surprising given the depth of engagement with the human relationship to, and treatment of, the environment that his work contains. Notable

exceptions have included Miriam Nichols's Deleuzian reading of Olson's oeuvre and Joshua Hoeynck's comprehensive analysis of Olson and Robert Duncan's engagements with "deep time" (Nichols 2010, 19-64; Hoeynck 2014, 336). Olson's work has been far more influential within the emergent field of ecopoetics, as recent essays by Harriet Tarlo and Jonathan Skinner attest.[1] Indeed, the continued influence of his work within contemporary ecopoetry alone might suggest that his oeuvre deserves greater attention from ecocritics. However, this essay will argue that the contribution that Olson's poetry and poetic theory makes to the historicisation of the 'new material' turn in critical theory provides further evidence that his work has a greater significance to contemporary ecocritical debates than has so far been acknowledged within the field. In what follows, I offer a 'material' ecocritical reading of Olson's ecopoetics in order to expose the notable equivalences between his mid-century response to the same mid-twentieth-century philosophy of science work that has proved so influential in shaping the 'material' turn in contemporary ecocritical theory.

The recent 'speculative turn' in continental philosophy laid the groundwork for many of the ideas that have developed within new materialism, and subsequently within material ecocriticism. However, the relationship between environmental thought and speculative realism should be read as reciprocal rather than linear; the exponential rise in the awareness of anthropogenic climate change, and of the Anthropocene as a geological era, have rendered the revaluation of the human relationship to Nature increasingly vital.[2] This concern is at play at the heart of the new materialist and the speculative turns: in *The Speculative Turn: Continental Materialism and Realism* (2011), Levi Bryant, Nick Srnicek and Graham Harman explicitly link the environmental crisis with the development of the speculative turn, declaring that 'the looming ecological catastrophe' led to the failure of anti-realist continental philosophy and the need for Western philosophy to speculate 'once more on the nature of reality independently of thought and of humanity more generally' (Bryant, Srnicek and Harman 2011, 3). Such 'anti-anthropocentrism' is also fundamental to new materialism; as Rick Dolphijn and Iris van der Tuin write in *New Materialism: Interviews and Cartographies* (2012): 'new materialism' 'does not privilege matter over meaning or culture over nature', instead giving 'special attention to matter, so neglected by dualist thought' (Dolphijn and Van der Tuin 2012, 85).

The field of ecocriticism has enthusiastically embraced new materialism as a methodology: influential material ecocritical studies including Jane Bennett's *Vibrant Matter: A Political Ecology of Things* (2009), Stacy Alaimo's *Bodily Natures: Science, Environment and the Material Self* (2010) and Serpil Opperman and Serenella Iovino's *Material Ecocriticism* (2014), alongside the recent work of Timothy Morton, have transformed ecocriticism in recent years, with new materialist reading practices increasingly influencing the direction of the field's development.[3] However, ecocriticism has so far failed to recognise mid-century American writers' contemporaneous responses to the same philosophy of science work that is now transforming the field of critical theory. As this article will detail, the work of Charles Olson represents one such contemporary response to quantum-influenced

philosophy, which has produced a lasting and influential legacy within contemporary ecopoetics.

Whitehead, Bohr and New Materialism

By far the most prominent figure in the recent revival of mid-century philosophy of science writing within contemporary critical theory has been the 'process' philosopher Alfred North Whitehead. Bruno Latour acknowledges the influence of Whitehead's thought in the development of 'Actor-Network Theory', and cites Whitehead's writing on the 'bifurcation of Nature' as significantly informing his most recent work, *Facing Gaia: Eight Lectures on the New Climate Regime* (2017) (2007, 61; 2017, 85). Similarly, Graham Harman's 'Object-Oriented Ontology' is substantially influenced by Whitehead's 'process' philosophy (Harman 2002; Harman 2005).[4] Others, including Isabelle Stengers and Didier Debaise, have made Whitehead's thought still more explicitly foundational to their continental realism, whereas elsewhere, field-leading theorist Donna Haraway has credited Whitehead as 'a great influence' on her foundational new materialist work (Stengers 2011; Debaise 2017; Harwood 2013, 3). Inspired by new developments in twentieth-century physics including Einstein's work on relativity and the emergent field of quantum theory, Whitehead's 'philosophy of organism', outlined in *Process and Reality* (1929), is a comprehensive metaphysical schema within which every element of existence - from God to 'the mysterious quanta of energy' - has the character of a general instance, and the 'creative advance' of the world is generated by the changing relations of these 'actual entities' (Whitehead 1985, 18, 78, xiv).

The quite remarkable renewal of interest in Whitehead's thought in recent theoretical work is part of a wider turn towards mid-twentieth-century philosophy of science writing within the overlapping fields of 'speculative realism' and 'new materialism'; Iovino and Opperman explicitly characterise new materialism as a reinterpretation of materiality in response to 'the developments of twentieth-century science (relativity theory, quantum mechanics, string theory, theories of complexity and of chaos, etc) and the corresponding epistemological debates' (Iovino and Opperman 2012, 452). The work of Karen Barad has been particularly influential in this regard: Barad asserts that the philosophy of science writing of Niels Bohr has the potential to be catalytic in inciting contemporary onto-epistemological revisions of ideas of the human and of Nature. Barad derives both her 'agential realist' ontology and her concept of 'intra-action' from readings of Niels Bohr's mid-century philosophy of science writing (Barad 2007, 32-33). Bohr's 'principle of complementarity' derived from his consideration of the philosophical consequences of Werner Heisenberg's 'uncertainty principle' – a cornerstone of the new quantum physics, which determined that the position and velocity of an electron could not be determined 'simultaneously with a high degree of accuracy' (Heisenberg 2000, 12-13). A key contention of Bohr's 'complementarity principle' (1927) is that an 'observation of a system can never be made without disturbing the system'. One result of this is that 'the classical distinction between the observer and the observed

is no longer tenable' (Kragh 1999, 209).[5] Barad's concept of 'intra-action' derives from Bohr's argument that observer and observed can only be separated artificially through the act of observation or measurement. As Barad describes, intra-action recognises that 'distinct agencies do not precede, but rather emerge through their intra-action'. The designation of distinct agencies is therefore itself only possible in an artificial, relational sense, as 'agencies are only distinct in relation to their mutual entanglement'.[6] Therefore, Barad contends, the material and the discursive emerge simultaneously, and individuals do not pre-exist, but rather 'emerge through […] their entangled intra-relating' (Barad 2007, 33, ix).Alongside Barad's influential work, leading ecocritic Timothy Morton has also drawn extensively on the work of Bohr in developing his Object-Oriented Ontology-inspired theorisation of the 'hyperobject' (Morton 2013, 1).[7]

Both Alfred North Whitehead's 'philosophy of organism' and Niels Bohr's 'complementarity' have therefore proved instrumental within contemporary theory's efforts to develop new onto-epistemologies that depart from anthropocentrism by depicting the human mind-and-body as fundamentally entangled with a 'material' environment. This is perhaps not surprising: new philosophical perspectives emerging from the quantum revolution such as those of Whitehead and Bohr necessarily think human and environment together as indistinct and fundamentally entangled. Both of these early twentieth-century philosophers therefore offer philosophical treatise that appear 'ready-made' for contemporary new materialist attempts to rethink human-world relations at the level of what Jane Bennett has termed 'vibrant materiality' (Bennett 2010, viii). However, as this article will demonstrate, recourse to the work of Heisenberg, Bohr and Whitehead in order to reconsider the human-world relationship is not a new development. Rather, this trend in contemporary theory has an important and unacknowledged predecessor in the mid-twentieth-century experimental poetics of the American poet Charles Olson.

In order to highlight this continuity of influence and effect, this article will read Olson's poetry and prose with reference to the theoretical work of new materialist ecocritic Stacy Alaimo. Such a pairing may initially appear incongruous: Alaimo is a leading ecofeminist, whilst the conspicuous absence of the female and occasional presence of misogynistic language in Olson's work have been frequently remarked upon by his critics (West and Lay 2000, 182; Montgomery 2015, 163). However, both Alaimo and Olson draw second-hand on the philosophy of Niels Bohr in order to reconsider the human body as materially interdependent with the environment. Furthermore, although Alaimo does not refer to Olson's work, she does offer a contemporaneous example of her concept of 'trans-corporeality' – which she primarily depicts as applicable to 'late twentieth and early twenty-first century realities' – in the form of the 'trans-corporeal landscape' of Muriel Rukeyser's *The Book of the Dead* (1938) (Alaimo 2010, 2, 48). In *Bodily Natures*, Alaimo introduces 'trans-corporeality' by arguing that 'imagining human corporeality as trans-corporeality, in which the human is always intermeshed with the more-than-human world, underlines the extent to which the substance of the human is ultimately inseparable from "the environment"' (2010, 2). 'Trans-corporeality' is strongly

influenced by Barad's concept of 'intra-action'; Alaimo reiterates Barad's emphasis on material entanglement, arguing that 'emphasisng the movement across bodies' reveals 'the interchanges and interconnections between various bodily natures' (Barad 2007, 33; Alaimo 2010, 21, 2).[8] Bringing Olson's work into dialogue with Alaimo's theorisation of 'trans-corporeality' illuminates the affinities between the two writers' material, ecological depictions of the human. These affinities are, in turn, shown to be the result of the commonality of influence that exists between Olson's mid-century experimental poetry and Alaimo's new materialist theory – both draw on the same sources of mid-century philosophy of science writing in order to represent the human as a part of, and corporeally 'intermeshed' within, the material environment.

Olson was both fascinated by the ontological and epistemological implications of the mid-twentieth-century's emergent scientific developments and dedicated to the task of constructing a new poetics reflective of a new Scientific Age (Middleton 2015, 89-90, 98-105). His essays and letters reveal that he had read the philosophy of science work of Werner Heisenberg and Alfred North Whitehead; he also paid close attention to the coverage of contemporary science in the periodical press.[9] This interest in emergent scientific ideas translated into Olson's practice, with the poet lecturing extensively on aspects of contemporary science and philosophy of science whilst at Black Mountain College.[10] However, Olson's interest in contemporary scientific ideas was so diverse, and so directly influential upon his constantly evolving creative practice, that he has received a notably harsh reception by critics, with many interpreting his divergent, interdisciplinary academic interests as 'amateurism' (Rifkin 2000, 65). I would not necessarily contest this charge. Rather, I would note, as Peter Middleton does, that whilst it is certainly possible to argue that Olson's engagement with, and understanding of, contemporary science was dilettante and incomplete, the fact that critics have largely ignored the impact of science on his poetics nevertheless represents a major omission. Middleton's recent book *Physics Envy: American Poetry and Science in the Cold War and After* (2015) is one of the first studies to take the influence of twentieth-century science on Olson's poetics seriously, with Middleton arguing that Olson's significance and influence as a modern American poet 'crucially depends on his struggle to create a poetics responsive to the ascendency of the sciences' (93). This essay will agree that contemporary science constitutes a major and determining influence on Olson's work, whilst diverging from the work of Middleton and others in its focus on the transformative impact of concepts derived from quantum science on Olson's 'trans-corporeal' presentation of the human and its relationship to the environment.

Quantum Physics and Projective Verse

The new approach to poetic composition that Olson outlines in 'Projective Verse' (1950) is highly coloured by the language of contemporary science. Olson terms his new methodology 'composition by field' — a title that, as Peter Middleton has noted, draws primarily on Albert Einstein's contemporary concept of 'Unified

Field Theory' (Middleton 2015, 101).[11] Olson also repeatedly describes the poem as a 'high energy construct' throughout the essay — 'high energy' physics is another name for the field of particle physics. Indeed, the opening paragraph of 'Projective Verse', alludes to the essay's close relationship to contemporary scientific developments. In these opening sentences, Olson asserts that the 'projective' poet 'has to be, instant by instant, aware of some several forces just now beginning to be examined'. After situating the manifesto in relation to these new, emergent 'forces', Olson proceeds to argue that poetry must move away from old, 'inherited' or 'closed' verse forms and create a new, 'OPEN' form of poetry (Olson 1950, 239-240). The 'new forces' to which Olson refers in these opening sentences could be electromagnetic force, which Einstein had sought – ultimately unsuccessfully – to reconcile with his new concept of 'general relativity' through 'Unified Field Theory' in 1950 (Middleton 2015, 101). Equally, the reference could be to Werner Heisenberg's 'uncertainty principle', and Bohr's associated philosophical principle of complementarity – a reading that is strongly supported by Olson's comments in a later essay, 'Human Universe' (1951).

In 'Human Universe', Olson reveals a direct connection between Heisenberg's 'uncertainty principle' and his new theory of 'projective' poetics, writing:

> the law remains, form is not isolated from content. The error of all other metaphysics is descriptive, is the profound error that Heisenberg had the intelligence to admit in his principle that a thing can be measured in its mass only in arbitrarily describing a stopping of its motion, or in its motion only by neglecting, for the moment of the measuring, its mass. And either way, you are failing to get what you're after (1997, 162).

This section of 'Human Universe' exposes the influence of Heisenberg's 'uncertainty principle' on the second law that Olson outlines in 'Projective Verse': 'Form is never more than an extension of content'. Olson attributes the phrasing of this second law to his friend and fellow poet Robert Creeley (1997 PV, 240). However, in relating the concept itself to Heisenberg's work, Olson actually mis-states the terms of the 'uncertainty principle'. The terms in which the 'uncertainty principle' is described are actually position and velocity, rather than 'mass' and 'momentum'; Heisenberg himself describes the principle in the following terms in *Physics and Philosophy* (1958): 'one could speak of the position and of the velocity of an electron as in Newtonian mechanics and one could observe and measure these quantities. But one could not fix both quantities simultaneously with an arbitrarily high degree of accuracy' (2000 [1958], 12-13). Despite this inaccurate phrasing however, I don't think there can be any doubt that it is Heisenberg's 'uncertainty principle' to which Olson is attempting to refer.

The relationship that Olson alludes to between his 'second law' of projective poetics and the 'uncertainty principle' is not straightforward, and rests on what Olson describes as the 'error of all other metaphysics [being] descriptive'. Olson advocates for poetry to move away from objective description, or mimesis, in response to

quantum physics' contention that Nature cannot be objectively observed or described – as exposed by Heisenberg's 'uncertainty principle' and Bohr's related principle of 'complementarity', which also emerged in 1927. Bohr's theory of 'complementarity' was offered partly as a corrective to Heisenberg's 1927 paper on the 'uncertainty principle', and Heisenberg incorporated an acknowledgement of Bohr's correction as a postscript to the paper (Barad 2007, 115-116). Together, Heisenberg's 'uncertainty principle' and Bohr's theory of 'complementarity' demonstrated the fundamental impossibility of the detached and objective description of Nature, by revealing the inherent inseparability of the observer and the observed; as Barad describes it: 'the key point is "quantum wholeness", or the lack of an inherent/Cartesian distinction between the "object" and the "agencies of observation"'(2007, 118). This fundamental principle of an inherent inseparability between observed and observer is reflected in Olson's theory of poetic composition; 'Projective Verse' advances a poetics within which the content of the poem dictates the poem's form, through a process of 'energy transfer', the 'conductor' of which is the poet. As the following analysis will explore, Olson's concept of 'poet-as-energy-conductor' therefore works precisely because of his 'trans-corporeal' understanding of the human as materially embedded in, or 'intermeshed with', the more-than-human world (Alaimo 2010, 2). 'Composition by field' therefore represents an abandonment of the objective, detached observation and description of Nature, which the work of Heisenberg and Bohr in 1927 had shown to be a fundamental impossibility; instead, Olson describes a poetics derived from the entanglement of observer and observed – poet and environment. In doing so, his work prefigures later new materialist theoretical concepts that also derive from Bohr's mid-century philosophy of science work, including Karen Barad's 'intra-action' and Stacy Alaimo's 'trans-corporeality'.

Olson begins 'Projective Verse' by arguing that his contemporary moment requires a new kind of poetics that emerges from the physical processes that embed the poet within their environment:

> Verse now, 1950, if it is to go ahead, if it is to be of essential use, must, I take it, catch up and put into itself certain laws and possibilities of the breath, of the breathing of the man who writes as well as of his listenings (1997 PV, 239).

The corporeality of the poet is presented as fundamental to the process of writing in 'open' form. The poet's physical processes – their breathing, perception and the material pathways of their nervous system – create a system through which the 'energy' that 'propels' the poet towards poetic composition is translated, or 'discharged', into the finished poem. Olson outlines three steps, or rules, for the poet engaged in 'open' verse composition, or 'composition by field', the first of which is that the poem should be 'energy transferred from where the poet got it (he will have some several causations), by way of the poem itself, all the way over to, the reader [*sic*]'. The poem is therefore a translation of energy from world into poem, by way of

the physical processes of the poet. Olson stresses that the energy the poet 'gets in' to the poem through this process should be 'at least equivalent to the energy that propelled him in the first place'. However, he also states that it will be 'an energy that is peculiar to the verse alone', and different in kind from the 'energy that the reader, because he is a third term, takes away'. The energy contained within the poem is therefore both approximate to the energy the poet translates from their environment into the poem through the physical process that intermesh them within their surroundings, and also a distinct energy, being unique to the 'field' of the poem (1997 PV, 240, 239).

In turn, the energy that the 'projective' poem contains governs its 'open' form; this is the second of Olson's rules, 'FORM IS NEVER MORE THAN AN EXTENSION OF CONTENT', which he describes in 'Human Universe' as analogous to Heisenberg's uncertainty principle (1997 PV, 240). The connection between energy and form that the second rule expresses is explicated in Olson's third rule:

> (3) the *process* of the thing, how the principle can be made so to shape the energies that the form is accomplished […] it can be boiled down to one statement […] ONE PERCEPTION MUST IMMEDIATELY AND DIRECTLY LEAD TO A FURTHER PERCEPTION
>
> (Olson 1997 PV, 240).

Olson directs the poet to focus on the corporeal processes through which they engage with their environment, and to allow these processes to generate the poem's form. He emphasises the essential role of the 'trans-corporeal' connections further in the instruction to: 'keep in, speed, the nerves, their speed, the perceptions, theirs' (1997 PV, 242, 240). 'Projective Verse' therefore outlines a new method of poetic composition that develops from contemporary physics' demonstration of the fundamental inseparability of the observer and the observed – in Olson's translation, between poet and world. As a result, the 'trans-corporeal' location of the poet, embedded within and inseparable from the environment, becomes instrumental in dictating the poem's 'open' form. In response to the error that he declares in 'Human Universe' of a previously 'descriptive' metaphysics, Olson instead directs the poet to embrace their newly comprehended material entanglement within a web of 'forces' and 'fields' 'just now beginning to be examined' in order to generate a new kind of 'open' verse form fitted to the new, Scientific Age.

Later in 'Projective Verse', Olson further clarifies this new relationship between human and world, asserting that the 'projective' poet can 'know' Nature better by embracing their subjective, entangled – or 'trans-corporeal' – position. He argues that the poet can best practice 'projective' poetry by turning 'inwards', writing:

> If [man] stays inside himself, if he is contained within his nature as he is participant in the larger force, he will be able to listen, and his hearing through himself will give him secrets objects share. […] It is in this sense that the projective act, which is the artist's act in the larger field

> of objects, leads to dimensions larger than man
>
> (1997 PV, 247).

In this passage, the materially entangled position of the human body is again rendered fundamental to the projective act. Olson contends that the projective poet can 'know' Nature by 'staying' and 'hearing' inside their own body *because of* the commonality of matter and processes between the human body and the external world. Indeed, he goes as far as to suggest that the communication of the human's 'trans-corporal' situation, and the insight into 'dimensions larger than man' that this affords, is the primary, even sole, *raison d'etre* for the 'projective' poet, asserting that 'the use of a man, by himself and thus by others, lies in how he conceives his relation to nature, that force to which he owes his somewhat small existence' (1997 PV, 247). Notably, he does not depict the human as possessing any primacy in relation to Nature; rather, the human is described as a 'somewhat small' part 'enmeshed' within a larger material system.

At the close of 'Projective Verse', Olson reiterates this fundamentally anti-anthropocentric description of the human's relationship to the environment, and re-asserts the significance of acknowledging the human's 'trans-corporeal' location to the successful creation of 'projective' poetics:

> when a poet rests in [sound and language] as they are in himself (in his physiology, if you like, but the life in him, for all that) then he, if he chooses to speak from these roots, works in that area where nature has given him size, projective size (1997 PV, 248).

Here, Olson again depicts the nonhuman environment as the source of 'projective' poetry – a sentiment that is amplified by his choice of the word 'roots' in outlining the connection between the human and the environment that he asserts the poet 'must speak from' in order for their work to attain 'projective size'. Furthermore, the 'size' that speaking from these 'roots' in Nature allows the poet to realise is itself conceived of as a power derived from, and gifted by, Nature. Olson presents this range as an attribute that 'nature has given' to the poet, and again suggests that the poet may access these dimensions by embracing the 'trans-corporeal' processes that connect them to their environment. He also reaffirms the instrumental role of the commonality of matter and process between human mind-and-body and world in the development of a 'projective' poetics that is rooted in Nature, through the explicit directive that the poet should rest within their own 'physiology' in order to achieve 'projective size'. This instruction echoes his earlier call for the poet to 'stay inside himself' in order to access dimensions that are 'larger than man'. An understanding of the human as intrinsically intermeshed with the material environment, which quantum physics' emphasis on inherent inseparability at the "matter" level had newly illuminated, informs Olson's pronouncement that the poet should draw on their own 'trans-corporeal' processes in order to write from, and of, Nature. This newly conceived material interdependence between poet and the environment, which

Olson implores the poet to ‘speak from’, is foundational to Olson’s new, ‘projective’ poetics.

Olson’s ‘Process’ Landscapes

As Olson’s reference to Heisenberg in ‘Human Universe’ evidences, the ‘uncertainty principle’ clearly informed the laws of ‘projective’ poetics that Olson outlines in ‘Projective Verse’. However, Olson was also at times critical of Heisenberg’s interpretation of the philosophical implications of advances in the field of quantum physics. In a 1966 letter to Albert ‘Mike’ Glover, he critiques Heisenberg’s interpretation of the work of the Greek philosopher Heraclitus, counseling Glover not to: ‘get misled into any such idea as Heisenberg’s that one can change the word fire in Fragment 30 of Heraclitus’s Fragments to energy’ (355). His comments refer to Heisenberg’s suggestion that the word ‘fire’ in Fragment 30 of Heraclitus’s *Cosmic Fragments* can be substituted for the word ‘energy’ in its contemporary scientific definition. In *Physics and Philosophy*, Heisenberg asserts that: ‘modern physics is in some way extremely near to the doctrines of Heraclitus. If we replace the word ‘fire’ by the word ‘energy’ we can almost repeat [Heraclitus’s] statements word for word from our modern point of view’ [*sic*] (2000, 29). Heraclitus’s original declaration in ‘Fragment 30’ is: ‘This (world-) order (the same for all) did none of gods or men make, but it always was and is and shall be: an ever-living fire, kindling in measures and going out in measures’ (Heraclitus 1954, 307). Olson dismisses Heisenberg’s suggestion that a simple substitution can be made between the modern term ‘energy’ and Heraclitus’s concept of ‘fire’, calling Heisenberg’s contention ‘a modern cant, scientism anyway’. He also goes on to suggest that it is inadvisable for modern humans to attempt to retroactively ‘fit’ ‘words [they have] used successfully’ in a contemporary context into classical texts, acerbically punning that Heisenberg’s contention that the word ‘fire’ can be replaced with ‘energy’ is ‘a fit of modern man’s fit!’(2000 “To Albert Glover”, 356)

However, in a contemporaneous letter to that in which he gives such short shrift to Heisenberg’s attempts to reconcile classical philosophy and quantum physics, Olson praises the work of another contemporary philosophy of science writer, Alfred North Whitehead. Writing to Joyce Benson, he describes Whitehead as ‘possibly *alone* of men’ in seeing the lack of division between the ‘two Worlds’: the world within the human body and the world outside of it (Olson 2000 “To Joyce Benson”, 353-354). Olson also refers to the idea of ‘two worlds’ – one inside and one outside of the body – in ‘Human Universe’, where he describes ‘the only two universes which count […] that of himself, as an organism, and that of his environment, the earth and planets’ (156). His letter to Benson suggests that he was attracted by Whitehead’s work. It also hints at a greater degree of affinity with Whitehead’s thought than with other influential philosophy of science writers such as Heisenberg – a suggestion that is borne out by the body of Olson’s poetry, nonfiction writing and correspondence.[12]

The philosophical schema outlined in Whitehead’s *Process and Reality* was

profoundly influenced by the quantum 'revolution in contemporary physics' with which it was concurrent, and builds upon the considerable success of Whitehead's earlier foray into philosophy of science writing, *Science and the Modern World* (1925), which Michael Whitworth identifies as one of the 'three most important popular science books' of the early twentieth century (McHenry 2015, 48; Whitworth 1994, 69).[13]Olson's underlinings in his personal copy of Whitehead's *Process and Reality* reveal the particular significance that he attributed to Whitehead's doctrine of 'creative advance'. The following passage reproduces Olson's underlining:

> All relatedness has its foundation in the relatedness of actualities; and such relatedness is wholly concerned with the appropriation of the dead by the living—that is to say, with 'objective immortality' whereby what is divested of its own living immediacy becomes a real component in other living immediacies of becoming. This is the doctrine that the creative advance of the world is the becoming, the perishing, and the objective immortalities of those things which jointly constitute stubborn fact (Item 476, Charles Olson Research Collection).[14]

The ability of 'actual entities' to achieve 'objective immortality', as Whitehead describes in the passage of *Process and Reality* that Olson underlines, is achieved through their environmental interactions with, or 'prehensions of', each other. As Steven Shaviro explains, this key term, 'prehension', can be defined as any 'process – causal, perceptual […] – in which an entity grasps, registers the presence of, responds to, or is affected by, another entity. All actual entities constitute themselves by integrating multiple prehensions' (2011, 281). Therefore, in Whitehead's 'philosophy of organism', 'entities are actual even if they are no longer subjectively immediate', as 'when an occasion perishes', it nevertheless survives as an 'element in subsequent prehensions'. As a result, there is 'no such thing as ceasing to exist' in Whitehead's system, only ceasing 'to be present' (McHenry 2015, 105, 106). Past 'actual entities' possess what Whitehead describes in the passage underlined by Olson as an 'objective immortality', in that they have a significant and shaping impact upon the 'becoming' of the 'actual entities' that exist within the present. Whitehead's 'process' philosophical system therefore represents an inherently interdependent and dynamic 'one-substance cosmology', which prioritises the role of constant dynamic change, or 'becoming', as the subject of philosophical inquiry (Whitehead 1985, 18, 21).

The transformative impact of Whitehead's thought on Olson's writing of Nature is evident from late 1954, in the poem 'Maximus to Gloucester, Letter 27 [withheld]'.[15] As numerous critics have noted, Olson continuously quotes and misquotes Whitehead's *Adventures of Ideas* (1933) throughout this poem, and both Peter Middleton and Ralph Maud have argued that the very heavy reliance on Whitehead's conceptual schema that the poem displays caused Olson to initially withhold the piece, only to include it in later editions of *The Maximus Poems*, as the influence of Whitehead over his work intensified (Middleton 2015, 167; Maud 2005,

67).[16] Indeed, Middleton's reading of 'Letter 27' is that the poem exemplifies Olson's attempt to interrogate, or 'test out' Whitehead's 'process' philosophy (Middleton 2015, 166-167). However, Olson's depictions of Nature and of the human that appear in this poem, whilst exhibiting the particular influence of Whitehead, also develop and reflect on the psychological implications of the proto-new materialist, or 'trans-corporeal', understanding of the human's relation to its environment that he outlines in 'Projective Verse'. Therefore, I want to suggest that the influence of Whitehead's thought within 'Letter 27' should be read as part of a broader 'quantum imaginary' that develops in Olson's work from as early as his encounter with Heisenberg's work in 1950. Rather than representing an entirely new direction for Olson, I want to suggest that the encounter with Whitehead's quantum-inspired 'process' cosmology in late 1954 caused Olson to meditate further on the personal and psychological implications of his own post-quantum poetics, while simultaneously energising the radical new depictions of the relationship between 'human' and 'environment' that his 'projective' composition had produced.

In the opening stanza of 'Letter 27', the landscape is the focus of the poet's memory:

> I come back to the geography of it,
> the land falling off to the left
> where my father shot his scabby golf
> and the rest of us played baseball
> into the summer darkness until no flies
> could be seen and we came home
> to our various piazzas where the women
> buzzed
>
> To the left the land fell to the city,
> To the right, it fell to the sea
>
> (Olson 1983, 184)

The first line underscores the primary role of the landscape in memory formation: 'I come back to the geography of it' – an emphasis that is further exaggerated by the framing of the opening evocation of the summer evening with the repetition of 'the land'. Although it is clear from the poem's original title, 'The Ridge', that the description of the 'falling' land literally references the terrain on which Olson based the poem, the repetition of the term, and the progression from 'falling' to 'fell', also introduce a dynamism into the poem's description of the landscape that suggests a state of perpetual motion (Butterick 1978, 262). The elicitation of the physical processes involved in the generation of the landscape is further advanced by the inclusion of the term 'geography', which evokes both the dynamic geological processes of land formation and the human relationship to the landscape. Indeed, Olson's early drafts of the poem show that he changed 'geometry' to 'geography' in this line during the drafting process – his inclusion of the latter term was almost

certainly also partially inspired by the work of pioneering cultural geographer Carl O. Sauer, in which Olson took an interest from 1947 (Box 2:54, Charles Olson Research Collection; Maud 1996, 50). The journey from 'falling' to 'fell' in these opening lines therefore introduces a landscape that is both fundamental to human identity formation – it is the primary source of the memory described – and involved in a perpetual process of constant 'becoming' and 'perishing' that reflects the conditions of Whiteheadian 'process' philosophy.

The influence of Whitehead's thought becomes increasingly explicit throughout the poem; the opening memory of the summer party ends in the lines: 'under one of those frame hats women then/This, is no bare incoming/of novel abstract form' (Olson 1983, 184). In these lines, Olson continues to evoke the principles of Whitehead's 'process' philosophy through the poem's language and form. The most arresting example of this is the enjambment in these lines, which enables the jarring tense transition as 'then' collides with 'This'. The radical suddenness with which the poem asserts the existence of the related memory within the present moment — its 'objective immortality', to use Whitehead's terms — is also emphasised by the strategic use capitalisiation, which Olson only sparingly employs in the poem. The evocation of Whitehead's 'process' system is further established through the sentence's sudden severance, as the expectation of 'wore' in 'one of those frame hats women then' is interrupted by the imposition of an insistent present. The persistent disruptive infringement of the present moment is also manifested through the repetition of 'This' and its prominent position at the outer edges of the lines, which places a robust and continuous 'process' of 'creative advance', or 'becoming', at the centre of the poem's exploration of the relationship between memory, environment, and the human 'self'.

Throughout the poem, Olson continues to draw on Whitehead's *Adventures in Ideas* in order to enhance his presentation of the human body-and-mind as 'trans-corporeally' embedded within the material environment. In his original text, Whitehead posits the entanglement of human and environment at an elementary level, writing: 'the human body is indubitably a complex of occasions which are part of spatial nature' (1993, 243), and Olson once again adopts and adapts Whitehead's prose to form the lines:

> An American
>
> is a complex of occasions,
>
> themselves a geometry
>
> of spatial nature.
>
> (Olson 1983, 185)

The vision of the human relationship to the environment that the poem advances is a fundamentally interdependent one. As has been widely noted, the phrases 'complex

of occasions', 'of a spatial nature', and the later 'strict personal order', are all lifted almost verbatim from Whitehead (Butterick 1978, 264). The poem also adopts Whitehead's stance that the human body-and-mind are comprised of the 'objective immortality' of past 'prehensions', which become 'a real component in other living immediacies of becoming' in the present moment (Whitehead 1985, xiv). However, as Peter Middleton details in his reading of the poem, the subtle changes that Olson makes to Whitehead's language are also significant (Middleton 2015, 177). In particular, Olson's introduction of the word 'geometry' transforms Whitehead's staid prose into a far more evocative and arresting image of the human being as built from, as well as intermeshed within, its material environment. Olson's poetry therefore introduces Whitehead's concepts through imagery that exposes the radical and transformative implications of Whitehead's speculative metaphysics for the human as individual consciousness, by presenting the 'American' as a patchwork of engagements with the American environment. In doing so, Olson combines Whitehead's philosophy with his own lyrical reflection on the implications of process philosophy for the autonomy and identity of the human 'self'.

Indeed, Olson's depiction of the human as a composite, material 'entity' that is part of an 'intra-active', 'process' reality is not an entirely, or even an inherently, positive ecological vision. 'Letter 27' extends Whitehead's thought by considering in greater detail the implications for the human 'self' of it's newly conceived 'trans-corporeal' location. It also highlights the oppressiveness of the human's materially entangled position, which is proposed by both 'process' philosophy and the quantum physics that inspired it. The final lines of the poem move from positive depictions of a material unity between mind and body — 'I have this sense,/that I am one/with my skin' — into a stark elicitation of the relentless dynamic change of a process system, marked by an urgent insistence on the primacy of the present moment: 'Plus this – plus this'. Olson's dramatization of the perpetual 'becoming' and 'perishing' of the present precedes his reflective comment, following the semi-colon, on the impact for consciousness of a continually emerging present that is at the same time burdened with the ever-increasing material weight of the 'objective immortality' of past events: 'that forever the geography/which leans in /on me I compell/backwards' (Olson 1983, 185). These lines evoke the frenzied nature of the struggle for individuality within a 'process' system, as the consecutive placement of 'me' and 'I' re-enforce — even insist upon — the existence of individual consciousness under an oppressive weight of the 'objectively immortal' landscapes of the poetic persona's personal history and geography.

Past 'prehensions' of the environment are conceived as material events that 'lean in', and as they do, are 'compelled backwards' by the poetic persona. However, these repeated attempts to cast off, or resist, the weight of past 'occasions' contain an inherent futility by coming after the poem's measured intonation: 'from all that I no longer am, yet am,/the slow westward motion of/more than I am' (184). These lines initially appear to evoke ideas of 'Manifest Destiny' and Westward expansion. Olson's interest in the mythology of the American West was significant: he took Frederick Merk's course on 'The Westward Movement in American History'

whilst at Harvard, and maintained a belief in Frederick Jackson Turner's 'Frontier Thesis' for many year afterwards (Clark 2000, 47; Von Hallberg 1978, 237n.1). However, as George Butterick has demonstrated, the phrase 'slow westward motion' also references the precession of the equinoxes: the westward positional shift of the equinoctial points along the ecliptic. Butterick traces the connection between this imagery and Olson's reading of Whitehead, revealing that Olson 'looked up the definition of 'precession' in his dictionary, on meeting it in Whitehead', and found two definitions, one of which was the astronomical definition: 'A slow westward motion of the equinoctal points along the ecliptic [sic]'(1978, 264). By evoking the westward positional shift of the equinoxes, Olson embeds both Whiteheadian 'process' self-formation, which he again foregrounds in the preceding lines: 'the imposing/ of all those antecedent predecessions, the precessions/of me', and an Anglo-American history of Westward expansion, within a dynamic universe of process-relations (Olson 1983, 184). This allows him to further underline the human's suffocating insignificance if it is understood as one part within a dynamic and expansive 'process' environment.

Throughout 'Letter 27', Olson explores the implications of Whitehead's 'process' ontology for the human as individual consciousness. In doing so, he outlines an unsettling ecological vision in which previous environmental interactions with a dynamic landscape continuously govern the human body and mind in the present moment, and the boundaries and autonomous existence of consciousness are constantly prevailed upon and under threat. The poem reflects on both the ontological and the psychological implications of the materially interdependent, or 'trans-corporeal' location of the human that is central to Olson's strategy for the generation of a new, 'projective' poetics, as outlined in 'Projective Verse'. Reading Olson's work with reference to Stacy Alaimo's material ecocriticism both illuminates this fundamental aspect of Olson's ecopoetics and highlights the proximity between Olson's mid-century depictions of the poet as materially embedded within their environment and Alaimo's contemporary theorisation of 'trans-corporeality'. An appreciation of Olson's depictions of both poet and poetic persona as 'trans-corporeal' therefore provides a measure of historical contextualisation to the current 'new material' turn, by demonstrating that mid-century American writers engaged with the same sources of mid-twentieth-century quantum-influenced philosophy of science writing that are currently influencing the new materialist turn in contemporary theory, and produced comparable reconsiderations of the human relationship to the environment as a result of these engagements. As this essay has outlined, Olson's work responds to the quantum-influenced philosophy of Bohr, which he encountered through the work of Heisenberg, and Whitehead, by radically reconstructing the human as a 'complex of occasions' interdependently intermeshed within a material, 'process' environment. As a result, Olson's poetry and poetic theory can be read as an antecedent incident of recent theoretical work including Bruno Latour's 'Actor-Network Theory', Karen Barad's 'intra-action' and Stacy Alaimo's 'trans-corporeality'.

[1] See also Cooperman (2000), Selby (2013), Reilly (2010), Byers (2013) and Corey (2009).
[2] I have capitalised the term 'Nature' throughout, following the convention of Timothy Morton's *The Ecological Thought* (2010): Morton capitalises the term in order to draw attention to, and problematise, the term's many 'unnatural' connotations 'including, but not limited to hierarchy, authority, purity, neutrality and mystery' (Morton 2010, 3). My uses of the terms 'Nature' and 'ecology' throughout this essay reference Morton's theorisations of both terms as laid out in *The Ecological Thought*.
[3] See Morton (2013) and (2013).
[4] For Harman on his engagement with and divergences from Whitehead, see Harman (2011).
[5] 'Complementarity' arose from Bohr's contemplation of the philosophical implications of Werner Heisenberg's uncertainty principle. In order to circumvent the fundamental impossibility of objectively describing a quantum system that the uncertainty principle exposed, Bohr posited that despite the fact that the use of one set of classical concepts precludes the use of any other, two classical descriptions of a system can nevertheless be thought of as 'complementary', although mutually exclusive, descriptions of nature (Kragh 1999, 209-210). The most famous example of this is that of wave-particle duality, which Heisenberg elucidates in the following terms: 'Bohr considered the two pictures – particle picture and wave picture – as two complementary descriptions of the same reality' (Heisenberg 2000, 13).
[6] My use of the term 'entanglement' throughout this essay will refer to Barad's theorisation of the term, and should not be confused with the recent scientific concept 'quantum entanglement', which post-dates the mid-century quantum theory with which this essay is concerned.
[7] See (Morton 2013, 41, 43, 47) for example, for Morton's use of Bohr's work in defining and describing his concept of the 'hyperobject'. Morton does not quote Bohr directly, but uses David Bohm's writings to discuss Bohr's work.
[8] Barad describes the neologism 'intra-action' as: 'the mutual constitution of entangled agencies'. She elaborates on the difference between 'intra-action' and interaction: 'intra-action recognizes that distinct agencies do not precede, but rather emerge through, their intra-action' (2007, 33).
[9] See for example: Olson 'To Albert Glover' (2000), 353-357; Olson (2017),165, 177; Middleton (2015), 100.
[10] See Olson (1970) and Olson (1978).
[11] As Peter Middleton details in *Physics Envy*, Einstein's 'Unified Field Theory' was the subject of an aggressive, although ill-advised, publicity campaign in the early months of 1950 — just as Olson was working on 'Projective Verse'. Einstein 'retired' 'unified field theory' less than a year after it was debuted. However, the term 'field' surfaced again with the development of Quantum Electrodynamic, QED, or 'quantum field theory'. Middleton argues that this helped 'Projective Verse' to retain the semblance of contemporary relevance despite the failure of 'Unified Field Theory' (2015, 98-103).
[12] See Note (iv) and Charles Olson, *The Special View of History* (1970).
[13] For details of the extent to which Whitehead's thought draws on contemporary developments in quantum mechanics to develop a 'quantum ontology', see McHenry (2015) (92) and Epperson (2004). Both this summary and my interpretation of Whitehead are principally drawn from Leemon McHenry's critical reading of Whitehead's philosophical schema in his recent comprehensive study of Whitehead, *The Event Universe: The Revolutionary Metaphysics of Alfred North Whitehead* (2015).
[14] Olson's underlining on pages viii-ix in his copy of Alfred North Whitehead, *Process and Reality: An Essay on Cosmology* (Cambridge: Cambridge University Press, 1929).
[15] The date of Olson's first encounter with Whitehead has been generally accepted to be late in 1954 (Charters 1968, 84).
[16] 'Letter 27' was probably written in early December 1954, but the poem was not included in the first edition of *The Maximus Poems*, published in 1960 (Butterick 1978, 262). It was later incorporated into the collection from the 1968 Second Edition, and has become one of the most reprinted of Olson's poems (Middleton 2015, 166).

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